3.3 Mechanics: Moments: 10-minute Pack

EDEXCEL 9MA0 · Calculator allowed · about 10 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 State the SI unit of a moment.

(Total for Question 1 is 1 mark)

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2 A force of 40 N acts at right angles to a lever at a point 0.5 m from the pivot. Find the moment of the force about the pivot.

(Total for Question 2 is 1 mark)

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3 A rod is described as non-uniform. State what this tells you about the position of its centre of mass, compared with a uniform rod of the same length.

(Total for Question 3 is 1 mark)

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4 A force acting at right angles to a lever at a pivot produces a moment of 54 N m. Given that the force has magnitude 90 N, find the distance from the pivot to the point where the force acts.

(Total for Question 4 is 2 marks)

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5 A door is fitted with a single hinge mechanism. A cleaner pushes on the door with a force of 150 N applied at right angles to the door, at a point 0.8 m from the hinge.

(a) Calculate the moment of the 150 N force about the hinge, stating the appropriate units. **(2)**

(b) The hinge mechanism is rated to safely withstand a maximum moment of 100 N m before it risks damage. Determine, with a reason, whether the hinge is at risk of damage from this push. **(2)**

(Total for Question 5 is 4 marks)

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Mark scheme · 3.3 Mechanics: Moments: 10-minute Pack

Question 1

newton metre (N m) **B1**

Answer: newton metre (N m)

Question 2

20 cao **B1**

Answer: 20 N m

Question 3

the centre of mass need not be at the midpoint of the rod (unlike a uniform rod, whose centre of mass is always at its midpoint) oe **B1**

Answer: For a non-uniform rod, the centre of mass need not be at the midpoint (unlike a uniform rod, where it always is).

Question 4

d = moment / force = 54/90 **M1**

0.6 m cao **A1**

Answer: 0.6 m

Question 5

(a) moment = 150 x 0.8 oe **M1**

(a) 120 N m cao (units required) **A1**

(a) Answer: 120 N m

(b) correct conclusion: yes, the hinge is at risk **B1**

(b) valid reason: 120 N m (from part a) exceeds the rated maximum of 100 N m, ft their (a) **B1**

(b) Answer: Yes, at risk, since 120 N m > 100 N m

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